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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/528,603	09/29/2005	Ijeoma Uchegbu	0380-P03604US00	4005

110 7590 08/07/2008

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EXAMINER	
LEWIS, PATRICK T	

ART UNIT	PAPER NUMBER
1623	

MAIL DATE	DELIVERY MODE
08/07/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/528,603	UCHEGBU ET AL.	
	Examiner	Art Unit	
	Patrick T. Lewis	1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 May 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,33,34,44-47,51,52 and 55* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,33,34,44-47,51,52 and 55* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *21 March 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's Response Dated May 5, 2008

1. Claims 1-4, 33-34, 44-47, 51-52 and 55 are pending. An action on the merits of claims 1-4, 33-34, 44-47, 51-52 and 55 is contained herein below.

2. The objection to claim 53 has been rendered moot in view of applicant's amendment dated May 5, 2008.

3. The rejection of claims 1-4, 33-34, 44-47 and 51-52 under 35 U.S.C. 112, second paragraph, has been rendered moot in view of applicant's amendment dated May 5, 2008.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 1-4, 33-34, 44-47, 51-52 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kotze et al. Journal of Controlled Release (1998), Vol. 51, pages 35-46 (Kotze) and Kubota et al. Carbohydrate Research (2000), Vol. 324, pages 268-274 (Kubota) in combination.

Claims 1-4, 44-47 and 55 are drawn to a solubilizing carbohydrate polymer. Claims 33-34 are drawn to a method of forming a solubilizing carbohydrate polymer. Claims 51-52 are drawn to a method of dissolving poorly soluble drugs in a carbohydrate polymer.

Kotze teaches that for most therapeutic agents, administration via a nonparenteral route is the preferred choice and the oral route still remains the most convenient route of drug administration (pages 36 and 39). Therapeutic compounds are absorbed by two routes, namely the transcellular and paracellular transport pathways. In recent years advances in drug design made it possible to produce several new classes of drugs such as peptides and peptidomimetic agents. These compounds are

mostly large molecule pharmaceuticals which are highly hydrophilic in nature and do not partition to a large extent into the cell membranes, and are consequently excluded from the transcellular transport pathway. The absorption of these compounds is for the most part limited to the alternative paracellular pathway. Entry of molecules along the paracellular route is primarily restricted by the tight junctions. One approach to overcome the restriction of the paracellular transport pathway is the co-administration of an absorption enhancing agent which regulates the integrity of the tight junctions. The ideal enhancer will be non-toxic and act in a reversible way on the junctional complex. Several studies have highlighted the potential use of chitosan as an absorption enhancing agent for the administration of hydrophilic drugs. Chitosan is able to open the tight junctions to allow paracellular transport of large hydrophilic compounds due to an interaction of the positively charged amino group on the C-2 position of chitosan with the negatively charged sites on the cell surfaces and tight junctions. N-trimethyl chitosan chloride (TMC) was able to increase the transport of the hydrophilic compound fluoroscein isothicyanate-labeled dextran and the peptide drug buserelin in vitro in Caco-2 cell monolayers. TMC is a derivative of chitosan with superior solubility and basicity, even at a low degree of quaternization, compared with other chitosan salts. TMC with a degree of quaternization of 12.28% was presented.

Kotze differs from the instant invention in that Kotze is silent on the MW of the TMC employed; however, it would have been obvious and well within the purview of the skilled artisan to employ low MW TMC in view of the teachings of Kubota.

Kubota teaches that chitin is the second most abundant natural polysaccharide and exists largely in the shells of crustacea and insects (page 268). Chitosan can be readily obtained from chitin by deacetylation with alkali. The use of chitin and chitosan in various functional materials, including biomedical materials, has recently been developed. However, the applications of chitin and chitosan in biology, in which many enzyme assays are performed at neutral pH, is quite restricted, because they are essentially insoluble in neutral water. A simple and improved method of preparing highly soluble chitosan was developed using a series of chitosan samples of low molecular weights. To reduce the molecular weight, chitosan was treated with NaBO3 under the condition that chitosan was homogeneously dissolved in aqueous acetic acid. See Table 1 for degradation conditions and weight-average molecular weight of chitosan. Kubota revealed that highly soluble half N-acetylated chitosan could be prepared through a simple and improved method: reduction of the molecular weight of chitosan, followed by N-acetylation in aqueous acetic acid--the lower the molecular weight, the higher the water solubility (pages 273-274).

Thus, it would have been obvious to the skilled artisan at the time of the instant invention to use low-MW TMC because it was known that lowering the molecular weight increases solubility which would lead to more effective absorption enhancing agents.

Conclusion

8. Claims -4, 33-34, 44-47, 51-52 and 55 are pending. Claims -4, 33-34, 44-47, 51-52 and 55 are rejected. No claims are allowed.

Contacts

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Patrick T. Lewis whose telephone number is 571-272-0655. The examiner can normally be reached on Monday - Friday 10 am to 3 pm (Maxi Flex).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia A. Jiang can be reached on 571-272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Dr. Patrick T. Lewis/
Primary Examiner, Art Unit 1623

ptl